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or the south Pacific than to America. The American elements that are present are accounted for partly through introduction by winds or migratory birds, and partly as a residue of once more widespread forms that are now extinct except in Hawaii and America. The absence of conifers may similarly be explained by extinction, if they were ever present, or by the absence of suitable soil conditions. The almost complete absence, for example, of granitic or calcareous soils might well explain certain absences. It is noted also that great ocean deeps separate Hawaii from America, whereas it is much shallower between Hawaii and the Orient. It is concluded, therefore, that the Hawaiian flora has been derived for the most part from the southern Pacific region, and that the Hawaiian Islands are a remnant of a northeastern extension of some large land mass, once connected closely with south Pacific lands.—H. C. COWLES.

**Studies of cambium.**—BAILEY,<sup>14</sup> in a third paper on cambium, has made what he calls a cytological “reconnaissance.” In the preceding paper, reviewed in this journal,<sup>15</sup> he called attention to the size variations of cambial initials, and to the unusual opportunity offered by the cambium for the study of a number of fundamental cytological problems. In this preliminary study he has reached the following conclusions. The initials of the cambium, which may attain a length of more than 9000  $\mu$ , are uninucleate, and the “working distance” of their nuclei must extend in some cases for a distance of several thousand microns. The nucleo-cytoplasmic ratio may be relatively constant in ray initials, but varies enormously in fusiform initials. All the cambium initials of *Pinus Strobus* contain the diploid number of chromosomes. Small ray initials may contain as large chromosomes as adjacent fusiform initials with a volume 200–1000 times as large. Fusiform initials, which are frequently several hundred times as long as they are wide, divide longitudinally by an extraordinary extension of the cell plate. The various types of cell plate formation described by various cytologists are believed to be merely different phases or stages of a single general type of cytokinesis. These glimpses would seem to justify the writer in his belief that the cambium well deserves intensive cytological investigation.—J. M. C.

**Economic plants of Philippines.**—In an illustrated report BROWN<sup>16</sup> gives a series of descriptions of the indigenous food-producing plants of the Philippines. Many will be surprised to find the statement that the edible wild plants of these islands are less abundant, more inaccessible, and inferior in

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<sup>14</sup> BAILEY, I. W., The cambium and its derivative tissues. III. A reconnaissance of cytological phenomena in the cambium. Amer. Jour. Bot. 7:417–434. pls. 26–29. 1920.

<sup>15</sup> BOT. GAZ. 71:408. 1921.

<sup>16</sup> BROWN, WM. H., Wild food plants of the Philippines. Phil. Dept. Agric. and Nat. Res., Bur. For. Bull. 21:1–165. figs. 81. 1920.

quality to those found in the United States. There are certain notable exceptions, however, as the pili nut (*Canarium luzonicum*), which is abundant and superior to the almond in quality, and the wild mango (*Mangifera caesia*), with its delicious flavor. Nuts, seeds, fleshy fruits, buds, leaves, roots, and tubers are included in the list, and the drawings and photographs used to represent them are of excellent quality.

A companion report by WEST and BROWN<sup>17</sup> deals with native resins and oil-producing plants, which are rather numerous. One difficulty in the utilization of the resins of many of the trees is to be found in the large number of species found in any particular area, making the number of individuals of any one species in any locality rather small. Several of the oil-producing plants give promise of good results under cultivation. In this report, also, the illustrations and descriptions give much botanical information.—GEO. D. FULLER.

**Ecological research.**—In his report of the work of the Carnegie Institution for 1920, Director MACDOUGAL<sup>18</sup> indicates the lines of research being followed by various members of his staff, and affords hints of results being attained. He has been measuring in detail the growth of certain trees and the accumulation of food material by the potato. CANNON and FREE have continued their investigations of the growth of roots as related to aeration. The factors affecting plants in new habitats have been under investigation by MACDOUGAL, and his results seem to show that species may be the more readily transferred from cool regions to warm, from montane regions to maritime, and from regions of climatic extremes to those of equable climates than the reverse. SHREVE reports progress in a soil temperature survey of the United States and Canada, in his investigations of the arid Avea Valley, and in his explorations of the Santa Lucia Mountains. Mrs. SHREVE has studied seasonal changes in the transpiration of *Encelia farinosa*, and VINSON and GRIFFIN have investigated the changing composition of Salton Sea water. The strand vegetation near Monterey, California, has been examined by COOPER, and stations and quadrats established for more exact studies of the associations and their controlling factors. Evaporation rates on the Monterey peninsula are decidedly less than in the oak and chaparral region east of Monterey, and this may account for the pine forests covering the former area.—GEO. D. FULLER.

**Calcicoles.**—In a discussion of plants found on soils supposed to be calcareous, SALISBURY<sup>19</sup> makes it clear that the problem of the limitation of the

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<sup>17</sup>WEST, A. P., and BROWN, W. H., Philippine resins, gums, seed oils, and essential oils. Phil. Dept. Agric. and Nat. Res., Bur. For. Bull. 20:1-230. figs. 73. 1920.

<sup>18</sup>MACDOUGAL, D. T., Department of botanical research. Carn. Inst. Wash. Year Book for 1920. 19:49-81. 1921.

<sup>19</sup>SALISBURY, E. J., The significance of the calcicolous habit. Jour. Ecol. 8:202-215. 1920.